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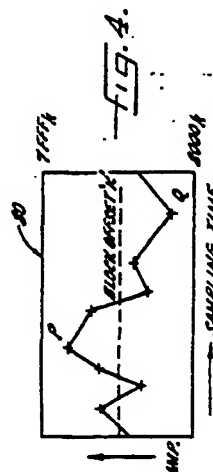
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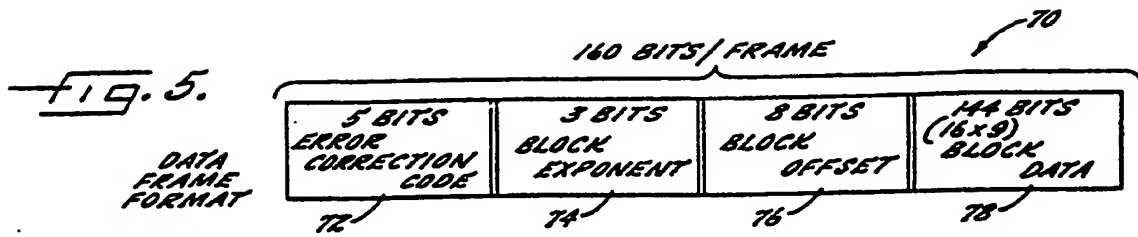
(54) Method and apparatus employing offset extraction and companding for digitally encoding and decoding high-fidelity audio signals.

(57) An audio signal is initially represented by a series of high-resolution pulse code modulated (PCM) data. A lower rate series of representative values are extracted from the initial series of PCM data. The PCM data are adjusted by offsetting in accordance with corresponding representative values and are then companded. The combination of the series of representative values and the companded PCM data provides a rate-compressed representation of the audio signal which is capable of being decoded after transmission or storage to reproduce the audio signal without substantial noise, distortion or loss of dynamic range. In one embodiment, the companding is performed by a floating-point conversion in which a common scale factor is determined for blocks of consecutive samples, a common offset is determined for each block by computing the arithmetic mean of the maximum and minimum PCM data values for the block and truncating the result, and the PCM data are adjusted by subtracting their corresponding common offsets. For encoding high-fidelity audio, preferably the audio signal is initially represented by a series of 16-bit PCM samples at a rate of at least 36 kilohertz, the block size is chosen to be 16 audio samples, and the encoded and compressed data for each block includes a 160 bit frame

consisting of an 8-bit block offset, a 3-bit block exponent, a 5-bit error correction code, and sixteen floating-point values each including eight data bits and one parity bit. This format permits 9 stereo audio channels and frame synchronization to be readily transmitted over a conventional video channel.



EP 0 293 533 A3





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EUROPEAN SEARCH REPORT

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EP 87 30 9331

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	DE-A-3 328 111 (TELEFUNKEN FERNSEH UND RUNDfunk GmbH) * Page 5, line 22 - page 9, line 28; figures 1-6 *	1-16	H 03 M 7/30 H 03 M 7/50 H 03 M 7/24
A	PATENT ABSTRACTS OF JAPAN, vol. 9, no. 43 (E-298)[1766], 22nd February 1985; & JP-A-59 183 542 (MITSUBISHI DENKI K.K.) * Whole abstract *	1-16	
A	PATENT ABSTRACTS OF JAPAN, vol. 9, no. 302 (E-362)[2025], 29th November 1985; & JP-A-60 141 024 (NIPPON DENKI K.K.) * Whole abstract *	1-16	
D,A	THE RADIO AND ELECTRONIC ENGINEER, vol. 50, no. 10, pages 519-530, October 1980; C. CAINE et al.: "NICAM 3: near-instantaneously companded digital transmission system for high-quality sound programmes"	9,15	
A	IEEE TRANSACTIONS ON COMMUNICATIONS, vol. COM-30, no. 4, April 1982, pages 574-580; K. NIWA et al.: "A new channel bank with block companding"		TECHNICAL FIELDS SEARCHED (Int. Cl. 4) H 03 M
A	JOURNAL OF THE INSTITUTION OF ELECTRONIC AND RADIO ENGINEERS, vol. 55, no. 7/8, July/August 1985, pages 247-252; J. ROBINSON: "An l.s.i.-based p.c.m. processor for high-quality sound transmission"		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-03-1990	Examiner SEGAERT P.A.O.M.P.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

